Docket No. AUS920000950US1

# APPARATUS AND METHODS FOR FILTERING CONTENT BASED ON ACCESSIBILITY TO A USER

## 1. Technical Field:

The present invention is directed to an improved computer system. More particularly, the present invention provides apparatus and methods for filtering content based on accessibility to a user.

## 2. Description of Related Art:

Recently there has been increased emphasis on designing Internet Web pages and content such that the content is accessible to persons having special needs, such as those having a handicap or disability. While there is an increased emphasis on the need to make content accessible, the reality is that much of the content still available over the Internet is not accessible to persons having special needs.

In an effort to identify Web content that is and is not accessible to persons having special needs, the Center for Applied Special Technology (CAST) has developed a software application entitled Bobby™. The Bobby™ software may be used to evaluate a Web page to determine if the Web page meets criteria that are based on accessibility guidelines promulgated by the World Wide Web Consortium. If Bobby™ determines that a Web page meets the accessibility criteria, the Web page administrator is permitted to add a Bobby approved icon to the Web page to indicate to handicapped or disabled persons that the Web page is accessible to them.

While Bobby™ provides a mechanism for evaluating Web pages, a user is not aware of whether a Web page is Bobby approved until after the user retrieves the Web page. In

fact, Bobby™ approved Web pages are a minority when taking into consideration all of the Web pages accessible via the Internet. Thus, since a user is not able to determine a priori that a Web site is handicapped accessible, i.e. Bobby™ approved, it is much more likely that a user will retrieve a Web page that is not handicapped accessible.

Moreover, if a handicapped person wishes to perform a search of Internet Web pages for a particular subject of interest, the results of the search will contain a majority of, if not all, handicapped inaccessible Web sites and only a minority of handicapped accessible Web sites. Furthermore, it is not possible for the user to determine which of the Web sites returned in the search results are handicapped accessible. Therefore, it would be beneficial to have apparatus and methods for filtering content based on whether or not the content is accessible to persons having special needs.

**SUMMARY OF THE INVENTION**

The present invention provides apparatus and methods for filtering content based on the accessibility of the content to a user. The apparatus and methods make use of an evaluation tool that evaluates requested content for accessibility to users having special needs, such as handicapped or disabled users. The results of the evaluation are then compared to a user's designation of a required accessibility level to determine if the content is accessible to the user. If the results of the evaluation indicate that the content meets the user's required accessibility level, the content is provided to the user. If the evaluation indicates that the content does not meet the user's required accessibility level, the content is not provided to the user or a not accessible indicator is appended to the content. In a further embodiment, the content may be modified to make the content accessible to the user.

## BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

**Figure 1A** is an exemplary block diagram illustrating a network data processing system according to one embodiment of the present invention;

**Figure 1B** is an exemplary block diagram illustrating a network data processing system according to two other alternative embodiments of the present invention;

**Figure 2** is an exemplary block diagram illustrating a server device according to one embodiment of the present invention;

**Figure 3** is an exemplary block diagram illustrating a client device according to one embodiment of the present invention;

**Figure 4** is an exemplary block diagram illustrating data flow according to one embodiment of the present invention;

**Figure 5** is an exemplary block diagram illustrating an interaction of components of the elements shown in **Figure 4**;

**Figure 6** is a flowchart outlining an exemplary operation of the present invention; and

**Figure 7** is a flowchart outlining an exemplary operation of the present invention according to an alternative embodiment.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the figures, **Figure 1A** depicts a pictorial representation of a network of data processing systems in which the present invention may be implemented. Network data processing system **100** is a network of computers in which the present invention may be implemented. Network data processing system **100** contains a network **102**, which is the medium used to provide communications links between various devices and computers connected together within network data processing system **100**. Network **102** may include connections, such as wire, wireless communication links, or fiber optic cables.

In the depicted example, content provider servers **108-112** are connected to network **102** along with personalized accessibility evaluation provider **106**. In addition, client device **104** is also connected to network **102**. The client device **104** may be, for example, a personal computer, network computer, personal digital assistant, portable computing device, or the like. In the depicted example, content provider servers **108-112** provide data, such as files, web pages, operating system images, and applications to client device **104**. Client device **104** is a client to content provider servers **108-112**. Network data processing system **100** may include additional servers, clients, service providers and other devices not shown.

In the depicted example, network data processing system **100** is the Internet with network **102** representing a worldwide collection of networks and gateways that use the TCP/IP suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host

computers, consisting of thousands of commercial, government, educational and other computer systems that route data and messages. Of course, network data processing system **100** also may be implemented as a number of different types of networks, such as for example, an intranet, a local area network (LAN), or a wide area network (WAN). **Figure 1A** is intended as an example, and not as an architectural limitation for the present invention.

The personalized accessibility evaluation provider **106**, as will be described in more detail hereafter, provides a filtering mechanism by which content received from content provider servers **108-112** is checked for objectionable content before being forwarded to client device **104**. The personalized accessibility evaluation provider **106** may be implemented, for example, on a proxy server to which the client device **104** is logged on (as shown), may be implemented as an application on the client device **104**, or as a network-resident service implemented by a proxy that resides on a service provider's premises through which content provider servers **108-112** are accessed, or the like.

In the case of the personalized accessibility evaluation provider **106** being implemented on the client device **104**, the personalized accessibility evaluation provider **106** may be a stand alone software application, a portion of a web browser application, a plug-in to a web browser application, or the like. For purposes of illustration, it will be assumed in the following description that personalized accessibility evaluation provider **106** is implemented on a proxy server. The proxy server is present between the client device and the

content provider server, and may either be a proxy server accessed by the client device or may be a reverse proxy of a content provider through which access to the content provider servers **108-112** is obtained, as shown in **Figure 1B.**

Proxy servers are generally known in the art and are available for common Internet services. For example, an HTTP proxy is used for Web access, and an SMTP proxy is used for e-mail. Proxy servers generally employ network address translation (NAT), which presents one organization-wide IP address to the Internet. The proxy server funnels all user requests to the Internet and fans responses back out to the appropriate users. Proxies may also cache Web pages, so that the next request can be obtained locally.

Referring to **Figure 2**, a block diagram of a data processing system that may be implemented as a server, such as content provider server **108-112** or a proxy server on which the personalized accessibility evaluation provider **106** may be resident, is depicted in accordance with a preferred embodiment of the present invention. Data processing system **200** may be a symmetric multiprocessor (SMP) system including a plurality of processors **202** and **204** connected to system bus **206**. Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. I/O bus bridge **210** is connected to system bus **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge

**214** connected to I/O bus **212** provides an interface to PCI local bus **216**. A number of modems may be connected to PCI bus **216**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors. Communications links to network computers **108-112** in **Figures 1A** and **1B** may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards.

Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI buses **226** and **228**, from which additional modems or network adapters may be supported. In this manner, data processing system **200** allows connections to multiple network computers. A memory-mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

The data processing system depicted in **Figure 2** may be, for example, an IBM RISC/System 6000 system, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) operating system.

With reference now to **Figure 3**, a block diagram illustrating a data processing system is depicted in which the present invention may be implemented. Data processing system **300** is an example of a client computer, such as

client device **104** in **Figures 1A** and **1B**. Data processing system **300** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures such as Accelerated Graphics Port (AGP) and Industry Standard Architecture (ISA) may be used. Processor **302** and main memory **304** are connected to PCI local bus **306** through PCI bridge **308**. PCI bridge **308** also may include an integrated memory controller and cache memory for processor **302**. Additional connections to PCI local bus **306** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **310**, SCSI host bus adapter **312**, and expansion bus interface **314** are connected to PCI local bus **306** by direct component connection. In contrast, audio adapter **316**, graphics adapter **318**, and audio/video adapter **319** are connected to PCI local bus **306** by add-in boards inserted into expansion slots.

Expansion bus interface **314** provides a connection for a keyboard and mouse adapter **320**, modem **322**, and additional memory **324**. Small computer system interface (SCSI) host bus adapter **312** provides a connection for hard disk drive **326**, tape drive **328**, and CD-ROM drive **330**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **302** and is used to coordinate and provide control of various components within data processing system **300** in **Figure 3**. The operating system may be a commercially available operating system, such as Windows 2000, which is available from Microsoft Corporation. An object oriented programming system such as Java may run in conjunction with the

operating system and provide calls to the operating system from Java programs or applications executing on data processing system **300**. "Java" is a trademark of Sun Microsystems, Inc. Instructions for the operating system, the object-oriented operating system, and applications or programs are located on storage devices, such as hard disk drive **326**, and may be loaded into main memory **304** for execution by processor **302**.

Those of ordinary skill in the art will appreciate that the hardware in **Figure 3** may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash ROM (or equivalent nonvolatile memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 3**. Also, the processes of the present invention may be applied to a multiprocessor data processing system.

As another example, data processing system **300** may be a stand-alone system configured to be bootable without relying on some type of network communication interface, whether or not data processing system **300** comprises some type of network communication interface. As a further example, data processing system **300** may be a Personal Digital Assistant (PDA) device, which is configured with ROM and/or flash ROM in order to provide non-volatile memory for storing operating system files and/or user-generated data.

The depicted example in **Figure 3** and above-described examples are not meant to imply architectural limitations. For example, data processing system **300** also may be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing

system **300** also may be a kiosk or a Web appliance.

**Figure 4** is an exemplary block diagram illustrating the data flow according to the present invention. As shown in **Figure 4**, the client device **410** sends content requests to the personalized accessibility evaluation provider **420** and receives filtered content from the personalized accessibility evaluation provider **420**. The term "content" as it is used in the present description is intended to mean any electronic information that is retrievable and able to be provided to a client device. Thus, "content" may be Web pages, including Web pages generated using Hypertext Markup Language (HTML), Wireless Markup Language (WML), and the like, applications, images, and the like. In the following exemplary embodiments, "content" will be assumed to be HTML Web pages. The term "filtered content" as it is used herein, is intended to mean content that has been evaluated for accessibility and compared to user designated accessibility requirements.

The personalized accessibility evaluation provider **420** forwards content requests from the client device **410** to the content provider servers **440-460** and receives requested content from the content provider servers **440-460**. The personalized accessibility evaluation provider **420** further retrieves user profile information from user profile database **430** for use in filtering the requested content received from the content provider servers **440-460**, as described hereafter.

With the present invention, the client device **410** issues requests for content to one or more of content provider servers **440-460** in a manner generally known in the art. For example, a user of client device **410** may enter a Uniform Resource Locator (URL) associated with a

Web page resident on content provider server **440** into a web browser application on the client device **410**. The entry of the URL into the web browser application causes the Web browser application to transmit a request for the Web page associated with the URL via a communication link to the personalized accessibility evaluation provider **420**. The content request from the client device **410** is routed through the personalized accessibility evaluation provider **420** which acts as a proxy server for the client device **410**.

Alternatively, the client device **410** may enter a search request using a search engine, such as those provided by Yahoo™ or HotBot™. The search engine may be resident on the personalized accessibility evaluation provider **420** and may search content providers that have been registered with or tracked by the search engine. Searching the content providers may include, for example, searching a locally stored version of the content provider web page, searching a locally stored version of an abstract of the content provider, or the like.

In either case, content is obtained, either from the content provider server **440-460** or from a locally stored copy of the content from the content provider server **440-460**. The personalized accessibility evaluation provider **420** then evaluates the obtained content to determine a level of accessibility for the content.

The level of accessibility may be defined, for example, as a level of accessibility for handicapped individuals or individuals having special accessibility needs. For example, the level of accessibility may be an organization of guidelines, such as those defined by the Web Accessibility Initiative (WAI) of the World Wide Web

Consortium standards body, as described in the Web Content Accessibility Guidelines, Techniques for WCAG, available from www.w3c.org, and which are hereby incorporated by reference. Thus, for example, the accessibility levels may be one or more organizations of the following current WAI guidelines:

(1) Provide alternative text for all images;

(2) Provide alternative text for each APPLET;

(3) Provide alternative content for each OBJECT;

(4) Provide alternative text for all image-type buttons in forms;

(5) If the submit button is used as an image map, use separate buttons for each active region;

(6) ALT text >150 characters, consider providing a separate description;

(7) Have a descriptive (D) link in addition to LONGDESC;

(8) If an image conveys important information beyond what is in its alternative text, provide an extended description;

(9) All audio files have transcripts;

(10) ASCII art is avoided;

(11) Provide a synchronized textual transcript for the audio in videos;

(12) Provide text links for all server-side image map hot-spots;

(13) Provide both a description and a synchronized caption for video information;

(14) Provide visual notification and transcripts of sounds that are played automatically;

(15) Avoid Client-side image map {0} that does not contain a link {1} elsewhere on the page;

(16) If a color is used to convey information, make sure the information is also represented another way;

(17) Foreground and background colors contrast sufficiently with each other;

(18) Where it's possible to mark up content (for example mathematical equations) instead of using images, use a markup language (such as MathML);

(19) Make sure the document validates to formal published grammars;

(20) Style sheets should be used to control layout and presentation wherever possible;

(21) Use relative sizing and positioning (% values) rather than absolute (pixels);

(22) Make sure that headings are nested properly;

(23) Use header elements in the proper sequence and not for bold text;

(24) Only use list elements for actual lists, not formatting;

(25) Use Q and BLOCKQUOTE for quotations, not indentation;

(26) Mark up quotations with the Q and BLOCKQUOTE elements;

(27) Identify any changes in the document's language;

(28) Use the ABBR and ACRONYM elements to denote and expand abbreviations and acronyms;

(29) Identify the language of the text;

(30) For tables not used for layout (for example, a spreadsheet), identify headers for the table rows and columns;

(31) If a table has two or more rows or columns that serve as headers, use structural markup to identify their hierarchy and relationship;

(32) Avoid using tables to format text documents in columns unless the table can be linearized;

(33) If a table is used for layout only, do not use structural markup to achieve formatting effects;
(34) Provide a summary and caption for tables;
(35) Provide abbreviations for long row or column labels;
(36) Be sure pages are readable and usable if style sheets are ignored;
(37) Ensure that descriptions of dynamic content are updated with changes in content;
(38) Each FRAME must reference an HTML file;
(39) Provide alternative content for each SCRIPT that conveys important information or functionality;
(40) Make sure pages are still usable if programmatic objects do not function;
(41) Make sure event handlers do not require use of a mouse;
(42) Provide a NOFRAMES section when using FRAMEs;
(43) Ensure that dynamic content is accessible or provides an alternate presentation or page;
(44) Make sure programmatic objects do not cause the screen to flicker;
(45) Avoid blinking text created with the BLINK element;
(46) Avoid scrolling text created with the MARQUEE element;
(47) Avoid using movement in images where possible;
(48) Do not cause a page to refresh automatically;
(49) Do not cause a page to redirect to a new URL;
(50) Provide accessible alternatives to the information in scripts, applets, or objects;
(51) Use a client-side image map instead of a server-side image map;

(52) Ensure that all elements that have their own interface are operable without a mouse;

(53) Specify a logical tab order among form controls, links and objects;

(54) Consider adding keyboard shortcuts to frequently used links;

(55) Consider furnishing keyboard shortcuts for form elements;

(56) Do not use pop-up windows or change the active window unless the user is aware this is happening;

(57) If scripts create pop-up windows or change the active window, ensure that the user is aware this is happening;

(58) Ensure that labels of all form controls are placed immediately before the control;

(59) Provided a linear text alternative for tables that lay out content in parallel, word-wrapped columns;

(60) Include default, place-holding characters in edit boxes and text areas;

(61) Separate adjacent links with more than whitespace;

(62) Use the latest technology specification available whenever possible;

(63) Avoid use of deprecated language features if possible;

(64) Allow users to customize their experience of the web page;

(65) If a page accessible cannot be made accessible, construct an alternate accessible version;

(66) Give each frame a title;

(67) Add a description to a frame if the TITLE does not describe its contents;

(68) Group long lists of selections into a hierarchy;

(69) Group related form controls and label each group;

(70) Group related elements when possible;

(71) Explicitly associate form controls and their labels

with the LABEL element;

(72) Create link phrases that make sense when read out of context;

(73) Add a descriptive title to links when needed;

(74) Do not use the same link phrase more than once when the links point to different URLs;

(75) Use metadata to add computer-understandable information about the page;

(76) Offer a site map or table of contents, and provide a description of the general layout of the site, the access features used, and how to use them;

(77) Use a clear, consistent navigation structure;

(78) Offer navigation bars for easy access to the navigation structure;

(79) Group related links;

(80) Provide a link at the beginning of a group of related links to bypass the group;

(81) Offer different types of searches for different skill levels and preferences;

(82) Place distinguishing information at the beginning of headings, paragraphs, lists, etc.;

(83) Provide metadata that identifies this document's location in a collection;

(84) If ASCII art is present, provide a means to skip over it;

(85) Use the simplest and most straight-forward language that is possible;

(86) Use icons or graphics (with accessible alternatives) to facilitate comprehension of the page; and

(87) Create a consistent style of presentation between pages.

The mechanism for evaluating the accessibility level of the received content may be, for example, a device that

analyzes the content for the occurrence, or lack thereof, of accessibility criteria generated based on, for example, the above accessibility guidelines. For example, the mechanism for evaluating the accessibility level may be the Bobby™ software available from CAST at www.cast.org/bobby/.

Bobby™ is a Web-based tool that analyzes Web pages for their accessibility to people with disabilities. CAST offers Bobby™ as a free public service. With the Bobby™ software, a user may enter a Uniform Resource Locator (URL) of a Web page that Bobby™ is to analyze. The Bobby™ software evaluates the Web page associated with the entered URL and generates a report indicating any accessibility and browser compatibility errors found in the Web page. Once a Web page meets accessibility requirements for at least one accessibility level, the Web page is allowed to display a Bobby™ approved symbol. Of course, other content evaluation devices, either now known or later developed, may be used without departing from the spirit and scope of the present invention.

Thus, the content received by the personalized accessibility evaluation provider **420** is evaluated using an evaluation tool to determine a level of accessibility. The evaluation may make use of a tool, such as Bobby™ to perform the evaluation of the received content. The result of the evaluation of the received content is an indicator of an accessibility level of the received content which is then compared to a required accessibility level identified in a user profile retrieved by the personalized accessibility evaluation provider **420** from a user profile database **430**.

For example, a disabled user may register with the personalized accessibility evaluation provider **420** and

establish a user profile which is stored in user profile database **430**. The user profile may indicate that the user requires that content retrieved from content providers **440-460** must meet level 1 accessibility requirements before the content is provided to the user's client device **410**. Level 1 accessibility may include, for example, accessibility criteria generated based on guidelines 1-20 set forth above; level 2 accessibility may include, for example, accessibility criteria generated based on guidelines 21-41 set forth above, and so on.

If after evaluation, the received content has an accessibility level that meets the user's requirements as set forth in the user profile, the received content is transmitted to the client device **410** as filtered content. In this way, only content that meets accessibility criteria set forth by the user will be provided to the user of the client device **410**. Thus, the user is only provided with content that has been designed to be accessible by a person having the disability or special need of the user.

While **Figure 4** shows the personalized accessibility evaluation provider **420** and the user profile database **430** as being separate devices from the client device **410**, the present invention is not limited to such an architecture. Rather, the personalized accessibility evaluation provider **420** and user profile database **430** may be resident on the client device **410** or one or more of the content provider servers **440-460**. If on the client device **410**, the personalized accessibility evaluation provider **420** may be implemented as a part of a Web browser application, a plug-in component of a Web browser application, or as a separate application on the client device **410**. If on a

content provider server **440-460**, the personalized accessibility evaluation provider **420** may be a reverse proxy for the content provider server **440-460**, for example.

**Figure 5** is an exemplary block diagram illustrating the primary operating components of the client device and personalized accessibility evaluation provider according to the present invention. The operation of the present invention will be described with reference to **Figure 5** when processing search results from a search engine. It should be appreciated that the present invention is not limited to application to search results from a search engine but is applicable to evaluation and filtering of any requested content, whether by means of a search engine or other tool for the retrieval of requested content.

As shown in **Figure 5**, the client device **510** contains an assistive technology device **520** that is used to communicate with the personalized accessibility evaluation provider **530**. The assistive technology device **520** may be, for example, a part of a browser application, a plug-in component to a browser application, or a separate application or device resident on the client device **510** that is used to direct content requests to the personalized accessibility evaluation provider **530**. For example, a user of the client device **510** may enter a search request into a search engine **540**, such as Yahoo™, associated with the personalized accessibility evaluation provider **530**. The entry from the client device **510** is directed by the assistive technology device **520** to the client device interface **560** of the personalized accessibility evaluation provider **530**. The personalized accessibility evaluation provider **530** receives the input

and forwards it to the search engine **540**.

The search engine **540** either searches a local storage of content provider abstracts, or broadcasts a search request to content providers **580-590**, and identifies content providers that provide the requested content in the search request. The results of the search are supplied to the personalized accessibility evaluation provider **530**.

The personalized accessibility evaluation provider **530** then supplies the results of the search, such as the content itself or the URLs for the search result entries, to the content evaluator **550**. The content evaluator **550** evaluates the search results for conformance with established accessibility criteria and returns a result of the accessibility level of the entries of the search results.

The personalized accessibility evaluation provider **530** then compares the accessibility level of the entries of the search results to accessibility level requirements set forth in a retrieved user profile for the user of the client device **510**. The retrieval of the user profile from the user profile database **565** may occur when the client device submits the search request, while search results are being compiled, while the search results are being evaluated, after the results of the evaluation are returned, or any other time during the above process.

Based on the comparison of the search results to the accessibility level requirements of the user profile, certain ones of the entries in the search results will be removed from the search results and others will be maintained based on whether or not the entries satisfy the accessibility level requirements. Only those entries that satisfy the accessibility level requirements are

maintained in the search results. Alternatively, all of the entries may be maintained in the search results with those that do not meet the accessibility requirements being appended to include an indicator that the entry does not meet the required accessibility level. The filtered search results are then provided to the client device via the client device interface **560** and assistive technology device **520**.

**Figure 6** is a flowchart outlining an exemplary operation of the present invention. **Figure 6** describes the evaluation of content for accessibility level. The content itself may be received through a number of different means including by way of a search engine, by direct request for the content from a client device, or the like. The operation outlined in **Figure 6** is not dependent or limited by the manner in which the content is requested.

As shown in **Figure 6**, the operation starts with content being received (step **610**). The content may be received in response to a request entered by a user via, for example, a web browser application of a client device, a search engine, or the like. The user profile for the user is retrieved (step **620**) and the content is evaluated for accessibility level (step **630**).

A determination is made as to whether the content meets the accessibility requirements set forth in the user profile (step **640**). This determination may be made by comparing the results of the evaluation of the content for accessibility level with the accessibility requirements set forth in the user profile, for example. If the content meets the accessibility requirements, the content is provided to the client device (step **650**). If the

content does not meet the accessibility requirements, a "Does not meet Accessibility Requirement" message may be returned to the client device (step **660**). The operation then ends.

Thus, the present invention provides a mechanism by which requested content may be filtered based on whether or not the requested content meets accessibility requirements of a user. The present invention makes use of a content evaluator, such as BobbyTM, to evaluate and identify an accessibility level of the requested content.

The accessibility level is then compared to accessibility requirements designated by a user, such as through a user profile. If the accessibility level meets the accessibility requirements, the content is provided to the user, otherwise the content is either not provided or an indication that the content does not meet accessibility requirements is appended to the content.

The above embodiments of the present invention illustrate the basic functionality of the invention. As described above, if content is determined to not meet accessibility requirements of a user, the content is either not provided to the user or an indicator of the inaccessibility is appended to the content. In a further embodiment of the present invention, if the content is inaccessible to the user, the content may be modified to make the content accessible.

For example, if content, such as a HTML Web page, is requested and determined to be inaccessible to the user, parameters in the HTML Web page may be adjusted to correspond to the accessibility criteria to make the HTML Web page meet the accessibility requirements of the user. That is, the values for various HTML tags may be modified to values that are designated by the accessibility

criteria.

As an example, during the evaluation of the HTML Web page, the various elements of the HTML Web page that do not meet the accessibility criteria may be logged. After the initial evaluation, the personalized accessibility evaluation provider may examine the log of elements not meeting the accessibility criteria and modify values of associated HTML tags to place these elements into conformance with the accessibility criteria. For example, display colors may be reset to provide greater contrast between background and foreground, ASCII art may be deleted, indentations for quotations may be replaced with Q and BLOCKQUOTE, and the like.

The particular modifications made may be based on values determined using a rule set, an algorithm, or the like. For example, a rule set may designate that if a background color is purple, the foreground color should be set to yellow. Similarly, the rule set may state that ASCII art is to be deleted and that double indentations are to be replaced with Q and BLOCKQUOTE.

Once necessary modifications are made, the modified content may be resubmitted to the evaluation tool for reevaluation. The result should be that the modified content is now accessible to the user and thus, the modified content is then provided to the client device. In this way, content that may otherwise be inaccessible to a user, may be made accessible.

**Figure 7** is a flowchart outlining an exemplary operation of the present invention according to this alternative embodiment. As shown in **Figure 7**, the steps **710-750** are similar to steps **610-650** in **Figure 6** and thus, a detailed explanation of these steps will not be

repeated. If the content is determined in step **740** to not meet accessibility requirements, a determination is made as to whether the content has already been modified (step **760**). If so, a "Does not meet accessibility requirement" message is provided to the client (step **770**). If the content has not already been modified, an attempt is made to modify the content to meet the accessibility requirements (step **780**). The results of the modification are then reevaluated at step **730** and the process designated by steps **740-760**. If the modified content meets the accessibility requirements in step **740**, the modified content is provided to the client in step **750**. Otherwise, if the modified content still does not meet the accessibility requirements, the "Does not meet accessibility requirements" message will be sent to the client in step **770** since the content has already been modified.

Thus, in this alternative embodiment, the present invention provides a mechanism by which inaccessible content may be made accessible to a disabled user. The content may be modified in view of its shortcomings, as determined from the initial evaluation of the content, in order to make the content meet accessibility requirements designated by the user. In this way, the amount of content available to the user is increased.

It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of

signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a particular data processing system.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.